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Digital sampling frequency converter

FIELD OF THE INVENTION

The present invention relates to a converter for converting an input digital signal into an output digital signal, said converter comprising a set of shift registers able to contain samples of the input or output digital signal.

It also relates to a method of converting an input digital signal into an output digital signal.

It finds its application in particular in digital television receivers, for example in a conversion of the image format.

BACKGROUND OF THE INVENTION

In many video systems, it is often necessary to effect a conversion of a digital signal from a first sampling frequency to a second sampling frequency, according to the image format required by the reception device. The conversion results in an enlargement or reduction of the original image corresponding to a up-sampling or a down-sampling of said image.

Such a conversion can be implemented by means of a finite impulse response filter FIR with a polyphase structure. Canadian patent number 2,144,111 describes a conversion method using such a filter. The term polyphase indicates a periodic representation of the phase differences between a sample of the input digital signal and a sample of the output digital signal. These phase differences are calculated according to the inverse of a zoom factor, the zoom factor representing the ratio between the number of samples of the output signal and the number of samples of the input signal. The polyphase filter functions in direct mode for an enlargement of the image, i.e. for a zoom factor greater than 1, and in transposed mode for a reduction of the image, i.e. for a zoom factor lower than 1.

A conventional polyphase filter comprises a convoluter able to supply an output digital signal sampled at a frequency f2 from an input digital signal sampled at a frequency f1 and a set of filtering coefficients. A memory associates with each possible phase difference a set of n filtering coefficients. The convoluter comprises shift registers for